Research Scientists

What They Do

Research Scientists apply scientific knowledge and theory to develop new biotechnology products. To accomplish this, they operate on the edge of scientific knowledge, and pioneer improved ways of solving existing problems. In some ways, these workers are the creative engine that drives the industry.

Research Scientists study living things and their component parts, including all forms of life—animals, plants, fungi, bacteria and viruses. These scientists must be extremely well-versed concerning their subject matter so that they can efficiently utilize company material and intellectual resources. Some work with potentially dangerous bacteria, viruses and hazardous chemicals. They must follow strict safety procedures to avoid harming themselves or others.

Research Scientists use the genetic code of organisms to determine which genes control different traits of organisms. This knowledge is used to help create drugs, vaccines, medicines and treatments for cancer, AIDS and many other diseases. They develop products to clean up hazardous waste, and develop new crops that resist disease or increase production of crops, milk, and animals. Scientists also dig deep into the inner workings of the cell so they can identify key areas where drug intervention can help cure diseases.

Research Scientists devise experiments, conduct research and even invent techniques and equipment they need to do their research. They often work as part of a team of other researchers and support staff that may include Research Assistants, Laboratory Technicians and Assistants who do most of the hands-on laboratory work. Scientists spend much time reading other research papers that have a bearing on their work. Research Scientists may supervise other Scientists and Research Associates and assume management responsibilities. They may publish the results of their research in peer-reviewed scientific journals, as well as attend meetings where they may present their findings to groups of other scientists.

*Research Scientists in the biotech industry share characteristics of Biochemists & Biophysicists, Microbiologists, Zoologists & Wildlife Biologists, Life Scientists, All Other, and Chemists. Detailed descriptions of these occupations may be found in the Occupational Information Network (O*NET) at online.onetcenter.org.*

Important skills, knowledge, and abilities include:

- Chemistry – Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.
- Biology – Knowledge of plant and animal organisms, their tissues, cells, functions, interdependencies, and interactions with each other and the environment.
- Physics – Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and subatomic structures and processes.
- Mathematics – Knowledge of arithmetic, algebra, calculus, statistics, and their applications.
- Science – Using scientific rules and methods to solve problems.
- Critical Thinking – Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.
- Complex Problem Solving – Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.

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- Inductive Reasoning – The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).
- Deductive Reasoning – The ability to apply general rules to specific problems to produce answers that make sense.
- Writing – Communicating effectively in writing as appropriate for the needs of the audience.

Training/Requirements

- Doctorate degree in a scientific discipline with up to two years of experience. (See **Additional Sources of Information**).

What's the California Job Outlook?

While the Bureau of Labor Statistics does not collect data on Research Scientists, the occupations listed below are found in the biotechnology industry and have similar duties. The California outlook and wages figures on the following page are drawn from all industries and represent occupations comparable to Research Scientists.

Standard Occupational Classification	Estimated Number of Workers 2002	Estimated Number of Workers 2012	Average Annual Openings	2005 Wage Range (per hour)
Biochemists & Biophysicists				
19-1021	2,700	3,700	190	$23.14 to $42.55
Microbiologists				
19-1022	1,600	2,200	110	$22.58 to $37.74
Zoologists & Wildlife Biologists				
19-1023	1,500	1,700	70	$19.54 to $33.54
Life Scientists, All Other				
19-1099	5,800	7,400	260	$27.02 to $40.97
Chemists				
19-2031	10,300	12,700	580	$20.51 to $37.71

These figures do not include self-employment.
***Average annual openings** include new jobs plus openings due to separations.*
Source: www.labormarketinfo.edd.ca.gov , Employment Projections by Occupation and OES Employment & Wages by Occupation, Labor Market Information Division, Employment Development Department.

Additional Sources of Information

Federation of American Societies for Experimental Biology
(301) 634-7000
www.faseb.org

Occupational Information Network (O*NET)
http://online.onetcenter.org

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